

# ***Leveraging Academic Research for Economic Development***

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# Personal background

- 23 years tech transfer/industry research director – in NC (Duke, NC State, UNC); and CA (Scripps)
- Centennial Campus, Carolina North, NC Biotech Center, Research Triangle Park, regional venture funds, entrepreneurship initiatives, etc.
- Helped launch more than 130 start-ups
- Key innovation policy leadership roles in national/international circles (AUTM, BIO, AAAS, National Academies, foundations; EU, Asia, etc.)



# UVa Innovation Partnerships role

- New position at UVa – signals commitment of university to accelerate translation of innovation for economic and social benefit
- Creativity / innovation drive knowledge economy
- Serve as “front door” to university for commercial and investment partners
- Promote / facilitate culture change within the institution – innovation / commercialization valued more highly, taught more widely, practiced more robustly



# Technology transfer today: INNOVATION Ecosystem

- It's about translational research and bridging the gap – “*getting it used!*”
- It's about partnerships, economic development, **AND IMPACT** – and better metrics (need to measure impact, not activity)
- It's about building and engaging in innovation ecosystems – researchers, seed funds, science parks, incubators, investors, entrepreneurs, jobs, development partners, etc.
- It's about talent recruitment and retention – and graduation
- It's about strategic management of IP assets

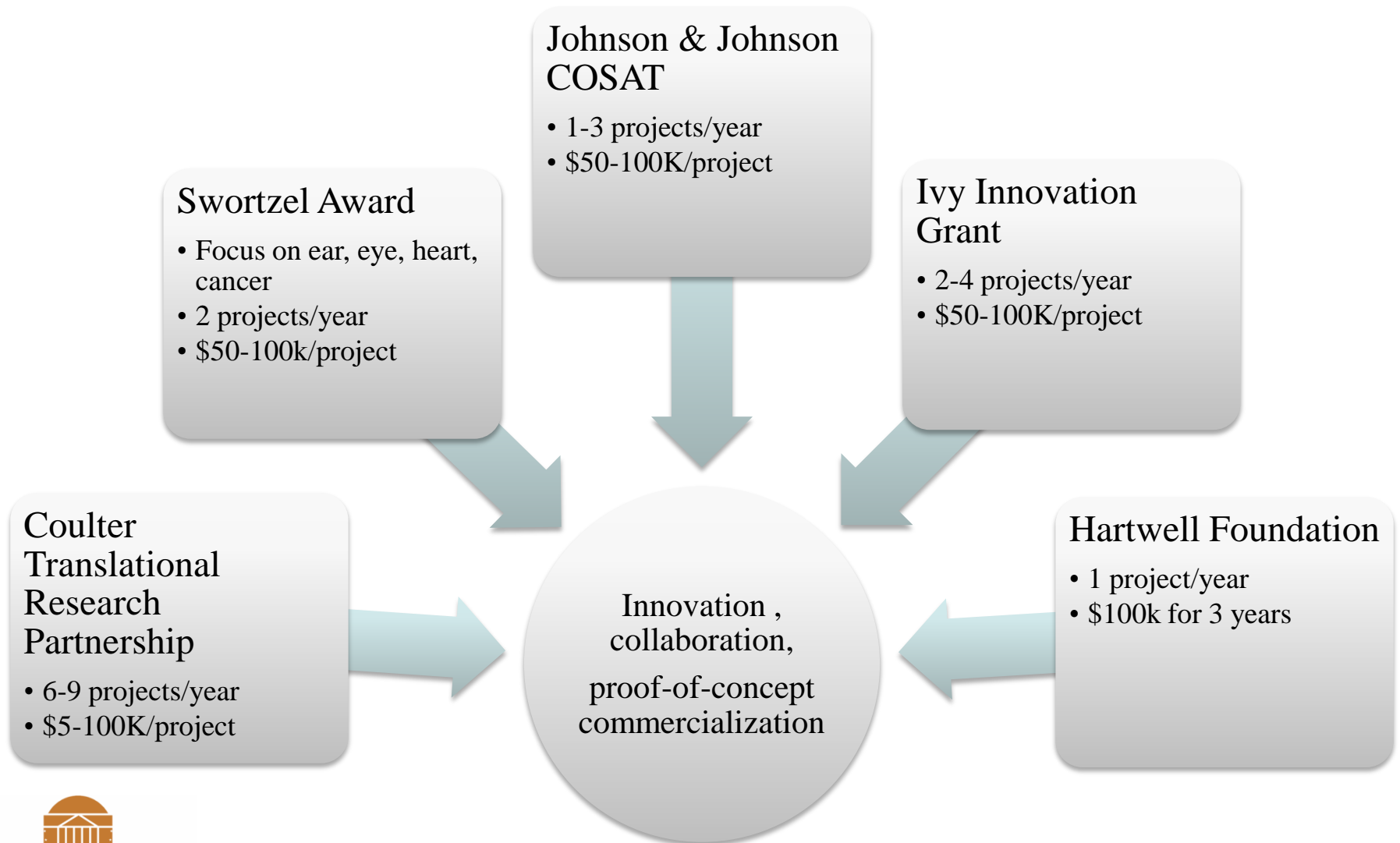


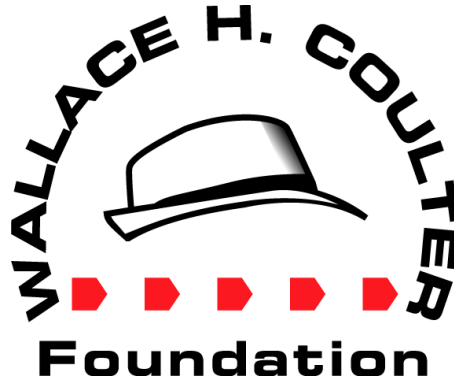
# INNOVATION Ecosystem: UVa's market-facing approach

- Moving from culture of invention to culture of innovation (from tech push to market pull)
- Addressing risk, adding value, creating impact – translating good ideas into enterprise
- Connecting and partnering across silos, disciplines, campuses, regions, and the world
- Incessantly revolutionizing from within (Schumpeter)
- Leveraging intellectual assets to solve real problems of the commonwealth; region; world!



# UVa: Leading in Translational Research





- \$600 M private foundation
- 1<sup>st</sup> national program - “Translational Research Partnerships” with universities; rigorous focus on process
- \$5.0 M over 5 years – funds 6-8 “seed projects” per year at \$100,000 each – will endow at up to \$10 M each (UVa’s cohort: Stanford, Michigan, Duke)



# UVA's Coulter Translational Project: Leading a Cultural Transformation in INNOVATION

## People ----- Patents ----- Products



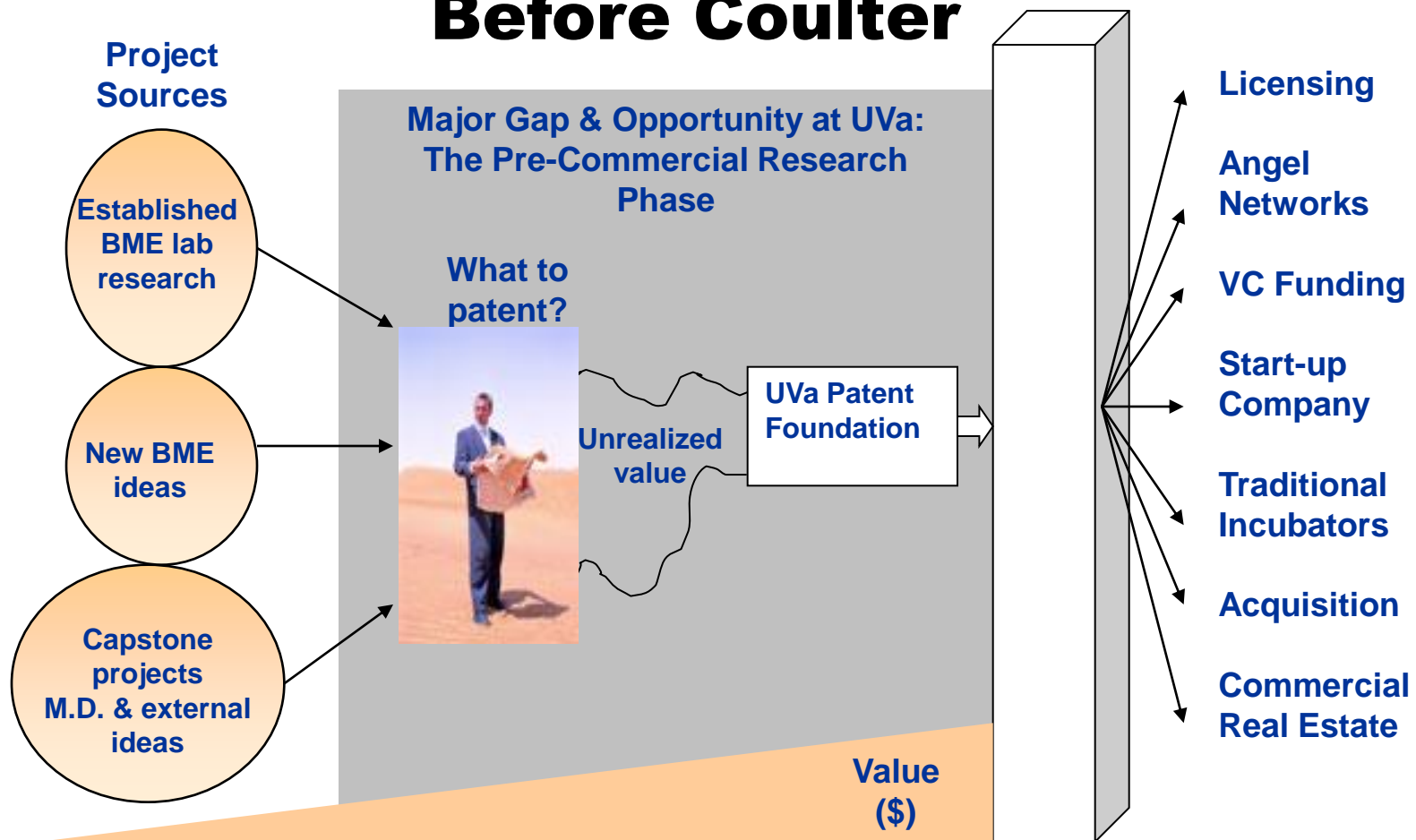
*Improving childhood surgery;  
imaging the heart; treating brain cancer*

- Faculty do **better basic research** after immersing themselves in complex translational challenges!
- 40 patent disclosures in 2 years (10x natl rate); 50% licensed (4x natl rate)
- **AUDITED RESULTS** – 4:1 return program-wide; top 3 projects generated 39:1 ROI)

*Translating knowledge to society...*

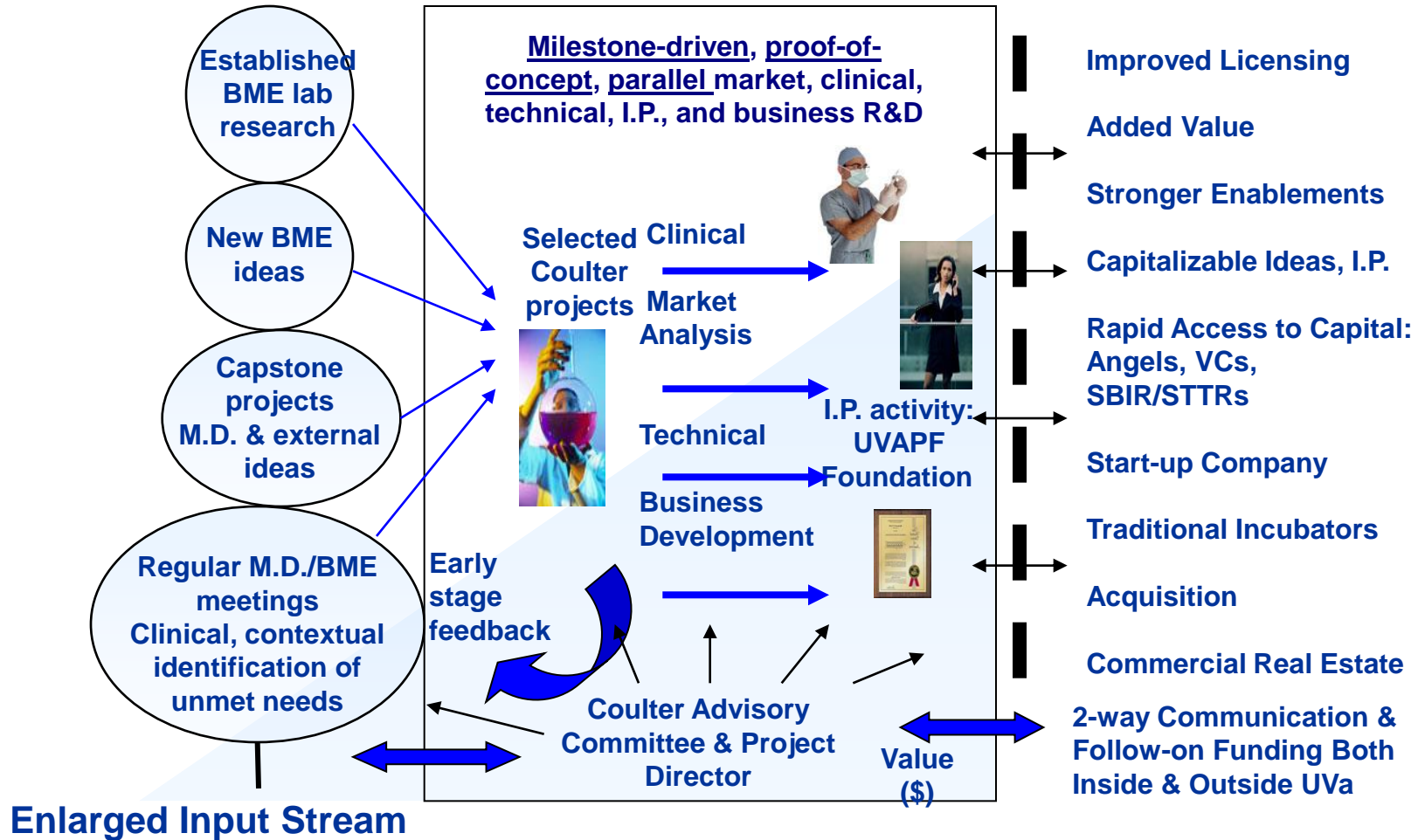


# Before Coulter



# New Pathway for Translational Research at UVA

## After Coulter A people-focused, parallel process



# Key Roles of Translational Research Team Managing Coulter Projects

- Enlarging the pool of prospective projects
- Making the right selections – exercise good judgment
- Establishing project milestones & market-driven paths
- Cutting rigorously if milestones are not met
- Advisory role – shaping the culture and the fine details of each project



# Coulter case study – HemoShear

- Technology uses a two cell types and grows them under flowing conditions to mimic the flowing blood in the body's arterial/venous systems. Purpose is to create a system that is very similar to humans, and use this system to test for drug toxicity in the vasculature
- Coulter program invested \$12,000 for key experiments, program costs, and mentoring
- Startup formed and recently raised \$600,000 in Angel financing
- Recent research agreement with 3 large pharmaceutical companies
- Company is currently raising its “B” round of venture financing



# Coulter Success Metrics

## Audited Results

- \$13M follow on funding raised (federal, state, investor, & corporate sponsored research)
- 4:1 ROI after 3 years and 39:1 ROI for our top three investments.

Over 28 patents disclosed and 50% out licensing ratio

- Compared to UVa average of 30%
- Compared to national average of 10-15%
- A change in culture and community –with 100% of faculty in BME participating, strong clinical collaboration, support from highest levels at UVa



# UVa's INNOVATION Ecosystem:

## Relationships drive results/impact

### Corporate

- Johnson & Johnson
- Abbott Diagnostics
- Medtronic
- Boston Scientific
- Vital Images
- Targesson
- Genzyme
- Bristol Myers Squibb
- Pfizer
- Merck
- Adenosine Therapeutics
- Luna Technologies
- Gore Technologies
- ImClone Systems
- Philips
- Siemens
- IBM

### Foundation

- Coulter Foundation
- Kauffman Foundation
- Hartwell Foundation
- Focused Ultrasound Surgery Foundation
- Whitaker Foundation
- Robert Wood Johnson Foundation
- Juvenile Diabetes Research Foundation

### Investor Networks

- Tall Oaks Capital Partners
- Virginia Active Angel Network
- Harbert Ventures
- De Novo Ventures
- InterSouth Venture Partners
- Southern Capital Venture Partners
- Healthcare Ventures
- Lumira Capital
- Aurora Venture Partners
- Hatteras Venture Partners
- Piedmont Capital
- Neuroventure Partners
- Hutchinson Law Group
- Morrison and Foerster



# Other UVa initiatives to build an Innovation Ecosystem

- UVa Venture Summit
- UVa Entrepreneurship Cup
- Innovation & Entrepreneurship Faculty
- Education Seminar Series
- Industry Design Innovation Events
- Incorporating innovation and translational research into curriculum
- Incorporating patenting/translation into tenure/promotion policies
- Collaboratives
  - BME Planet
  - Course teaching: Bio
  - Innovation, BME Capstone & Design
- Art & Science Design Gatherings
- National outreach (Congress)
- Advising NSF, FDA, White House, others on innovation



# INNOVATION Ecosystem: critical issues

- Partnerships and collaborations key – within and outside institution
- Develop stable sources of funding for innovation and translational initiatives – Proof of Concept Centers, seed funds, entrepreneurship education, and related programs essential
- Develop more scholarship around innovation and entrepreneurship to identify/disseminate best practices and useful metrics
- Align campus policies and state/federal laws/regs with innovation agenda
- “Instead of following the money, we need to lead the money to find more effective ways to invest in innovation” (Greg Simon, former President, Faster Cures)





# INNOVATION U in action (initiatives/case studies elsewhere )

- Tax incentives/credits
- Proof of Concept/Pre-Seed Venture Funds
- North Carolina Biotechnology Center
- Georgia Research Alliance
- Innovate Texas
- Arkansas Research Alliance
- Michigan's 21<sup>st</sup> Century Jobs (formerly Life Sciences Corridor)
- South Carolina Research Authority
- Science Foundation Arizona
- Florida investment in Scripps, Sanford-Burnham, etc.
- Ohio's Third Frontier
- Many others...



# INNOVATION U in action

## (initiatives/case studies elsewhere )

- Tax incentives/credits
  - Focus on qualified business venture credits to incentivize angel investments in university start-ups and in pre-seed funds focusing on university start-ups
- Proof of Concept/Pre-Seed Venture Funds
  - Captive angel or seed venture funds with economic development as well as ROI goals
  - Matching or sidecar funds ideal – reduce due diligence burden
- North Carolina Biotechnology Center
  - Comprehensive technology/infrastructure enhancement strategies focusing on biopharma sector – talent, research, facilities, equipment, business development, loans, investment funds, entrepreneurial development, centers of excellence, centers of innovation, etc.
- Georgia Research Alliance
  - “bucks for brains”; commercialization assistance; centers of excellence



# INNOVATION U in action

## (initiatives/case studies elsewhere )

- Arkansas Research Alliance
  - Modeled after Georgia Research Alliance and focusing on eminent scholars initially; identifying key sectors of strength and advocating resource allocation accordingly
- Michigan's 21<sup>st</sup> Century Jobs (formerly Life Sciences Corridor)
  - State invested its tobacco settlement money into research, angel and seed fund networks, entrepreneurial education and recruitment, incubators and accelerators, etc., to build a core capability and pipeline of innovation-based economic development
- Florida investment in Scripps, Sanford-Burnham, etc.
  - “If you build it, will they come?” Major investments to attract world class research institutions to the state



# THE RTP STORY

# North Carolina Economy – 1950s-1960s

- Big 3 industries were textiles, furniture and tobacco (farming)
- NC next to last (49<sup>th</sup>) in per capita income
- Basic economic development strategy – cheap land, cheap labor, low taxes
- Result – bad schools, poor public services, brain drain
- WELL KNOWN FOR: Pepsi, cigarettes, furniture, textiles, Krispy Kreme, NASCAR, barbecue, Andy Griffith
- BUT... great universities; and
- Visionary leaders and willingness to collaborate (government, business, universities)

# RTP – Original Cornerstones

- University excellence
- Enlightened business, university, political leadership re/ economic development – each with its role
- PARTNERSHIPS AMONG ALL THE ABOVE
- Big game hunting (private sector and government; later move to start-ups)
- Create NGO's to manage the Park (Research Triangle Foundation; TUCASI); and to lead cluster development (NCBC) – evolution of an entrepreneurial eco-system

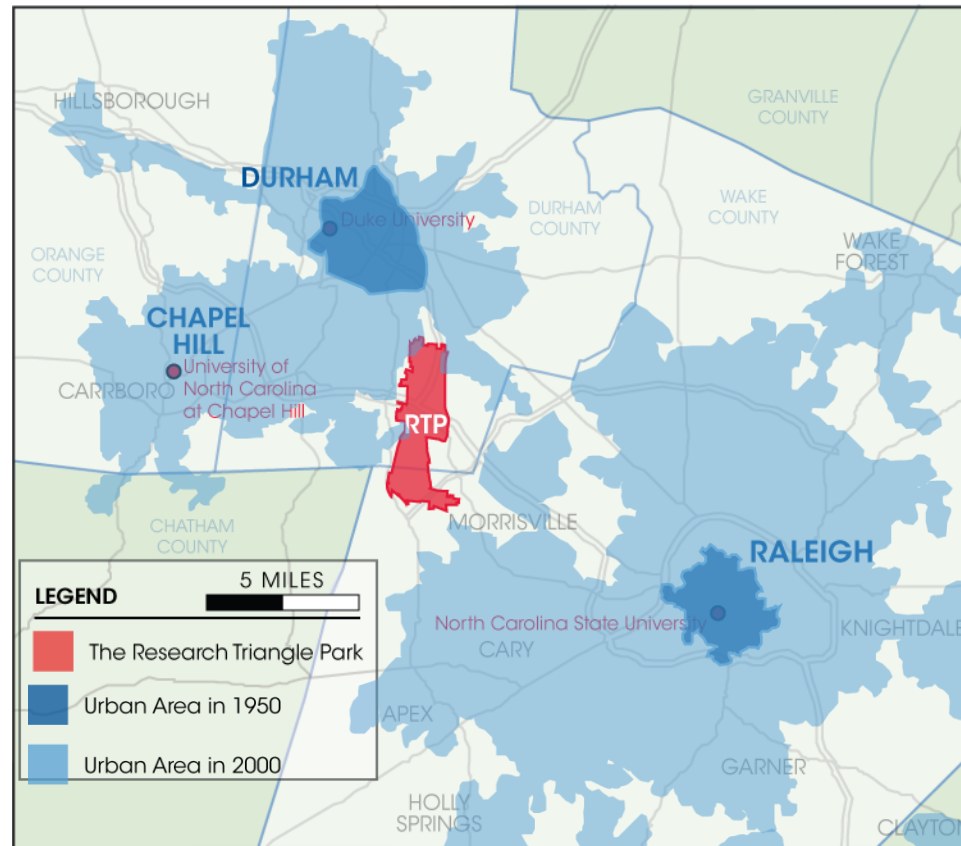
# RTP's innovation eco-system

- MCNC (Microelectronics Center)
- NCBC (NC Biotechnology Center)
- TDA (Technological Development Authority)
- CED (Council for Entrepreneurial Development)

## **COMBINED WITH**

- Strong technology transfer and industry partnerships
- Evolving venture capital strength
- Growing service sector to support the eco-system

# 1959 - RTP launched; what does it look like at almost 50 years old?



Sources: U.S. Census, Triangle J Council of Governments



# The RTP environment today

- 7,000 acres; 8 miles long; 2 miles wide
- 24.5M square feet of developed space
- 3 leading global universities (diverse research bases and constituencies) with strong tech transfer
- Diversified research / industry base; research strengths of firms mirror university strengths
- \$2.8 billion in capital investment
- \$2.7 billion annual payroll
- Research expenditures at 3 universities – more than \$1.5B

# The RTP environment today

- NC is 28<sup>th</sup> in per capita income; RTP average salary almost \$70K
- 1989 (1<sup>st</sup> 30 years) – 60 firms; 30,000 employees; most firms mid to large sized (*era of modest university tech transfer*)
- 2002 – 150+ R&D firms; 45,000+ employees; 52% have less than 10 employees (*era of major university tech transfer*); 86% have less than 250 employees
- 1500+ start-ups since 1970; 34% of current companies are start-ups

# The RTP environment today

- Major clusters in biotechnology, nano/bio, microelectronics, advanced materials, information technology, medical devices, and banking
- #3 Biotech region in US
- #1 place for technology businesses (Silicon Valley Leadership Group)
- #1 best places for business and careers (Forbes)
- #1 in Aggregated Innovation Capacity (Metropolitan New Economy Index)
- UNC, Duke & NC State in top 10 patent strength index

# RTP – Key Success Factors

- University research excellence must be maintained
- Alignment of research excellence with clusters
- Innovation embraced in universities
- Moving beyond licensing to catalyze development of entrepreneurial eco-system
- Lack of competition among players; willingness to partner – especially universities (culture of “hyper-collaboration”); social networks critical
- Strong community support (CED; UNC Commercialization Seminar Series)
- Diverse base key for surviving downturns

# RTP – Key Success Factors

- University involvement/participation in governance of key RTP NGO economic development entities
- Willingness to stay the course – (“all overnight successes at least 20 years in making”)
- Access to capital and management are key
- Some key legislation and policies – tax credit; Millennium campus legislation; SBIR matching funds, etc.